CLAIMS

WHAT IS CLAIMED IS:

1. A process for reinforcing, sealing or baffling a structure of an article of manufacture, the process comprising:

providing a structure of an article of manufacture, the structure having one or more internal walls defining a cavity therein;

molding a thermoplastic polymeric material to form a first carrier having a cellular structure wherein the molding process includes applying a sufficiently high temperature and sufficiently high pressure to the polymeric material for maintaining a gas within the polymeric material at a supercritical state;

applying an expandable material upon the first carrier to form the member;

inserting the member within the cavity of the structure; and

activating the expandable material to expand, contact and wet the internal walls of the cavity and then to cure and adhere the member within cavity.

2. A process as in claim 1 wherein the member is substantially planar and is configured as a baffle.

3. A process as in claim 2 wherein the first carrier includes a peripheral edge that is substantially continuously adjacent to the one or more internal walls of the cavity upon insertion of the member in the cavity.

4. A process as in claim 3 wherein the expandable material, upon expansion, substantially continuously spans a cross-section of the structure for dividing the cavity into at least two compartments that are substantially sealed against the passage of materials therebetween.

5. A process as in claim 1 wherein the member is configured as a reinforcement for the structure.

6. A process as in claim 5 where the first carrier has a length and at least one rib extending transversely relative to the length and at least one rib extending longitudinally relative to the length.

7. A process as in claim 1 wherein the polymeric material includes a polyamide.

8. A process as in claim 7 wherein the polymeric material includes a nylon.

9. A process as in claim 8 wherein the polymeric material weighs at least 10 % less than the same polymeric material in a non-cellular condition.

10. A process as in claim 9 wherein the polymeric material is about 60% to about 80% by weight nylon filled with about 20% to about 40% by weight glass fibers.

11. A process as in claim 1 wherein the step of molding the polymeric material includes supersaturating the polymeric material with blowing agent such that the blowing agent nucleates within the polymeric material to create the cellular structure within the first carrier;

12. A process for reinforcing, sealing or baffling a structure of an automotive vehicle, the process comprising:

providing a structure of an automotive vehicle, the structure having one or more internal walls defining a cavity therein;

molding a thermoplastic polymeric material to form a first carrier having a cellular structure wherein

i) the molding process includes supersaturating the polymeric material with blowing agent such that the blowing agent nucleates within the polymeric material to create a cellular structure within the first carrier;

ii) the thermoplastic polymeric material includes nylon; and

iii) the polymeric material weighs at least 3% less than the same polymeric material in a non-cellular condition.

applying an expandable material upon the first carrier to form the member;

inserting the member within the cavity of the structure; and

activating the expandable material to expand, contact and wet the internal walls of the cavity and then to cure and adhere the member within cavity.

13. A process as in claim 12 wherein the member is substantially planar and is configured as a baffle.

14. A process as in claim 13 wherein the first carrier includes a peripheral edge that is substantially continuously adjacent to the one or more internal walls of the cavity upon insertion of the member in the cavity.

15. A process as in claim 14 wherein the expandable material, upon expansion, substantially continuously spans a cross-section of the structure for dividing the cavity into at least two compartments that are substantially sealed against the passage of materials therebetween.

16. A process as in claim 12 wherein the member is configured as a reinforcement for the structure.

17. A process as in claim 16 where the first carrier has a length and at least one rib extending transversely relative to the length and at least one rib extending longitudinally relative to the length.

18. A process for forming a reinforced and baffled structural assembly of an automotive vehicle, comprising:

providing a structure of an automotive vehicle wherein:

i) the structure is a D-Pillar of the vehicle; and

ii) the structure includes one or more walls defining a cavity therein;

molding a polymeric material to form a first carrier having a cellular structure wherein:

i) the polymeric material is about 60% to about 80% by weight nylon filled with about 20% to about 40% by weight glass fibers; and

ii) molding the polymeric material includes supersaturating the polymeric material with blowing agent such that the blowing agent nucleates within the polymeric material to create a cellular structure within the first carrier;

molding a polymeric material for form a second carrier member wherein:

i) the second carrier member has a shape that at least partially corresponds the structure of the automotive vehicle;

positioning a first expandable material upon the first carrier to form a baffling member;

positiong a second expandable material upon the second carrier to form a reinforcing member;

disposing the baffling member and the reinforcing member within the cavity of the structure of the automotive vehicle;

expanding the expandable material of the reinforcing member to contact and adhere to the one or more walls of the structure of the automotive vehicle wherein:

i) the expandable material of the reinforcing member expands volumetrically to between about 100% to about 300% its original volume; and

expanding the expandable material of the baffling member to contact and adhere to the one or more walls of the structure of the automotive vehicle wherein:

i) the expandable material of the baffling member expands volumetrically to at least about 350% its original volume.

19. A process as in claim 18 wherein the second carrier has a length and at least one rib extending transversely relative to the length and at least one rib extending longitudinally relative to the length.

20. A process as in claim 18 wherein the polymeric material of the first carrier weighs at least 10% less than the same polymeric material in a non-cellular condition.